

# Thomas M. Daley

## **Experience:**

2014 - Department Head, Geophysics, Earth Science Division, Lawrence Berkeley National Laboratory  
2011-2014 Staff Scientist, Earth Science Division, Lawrence Berkeley National Laboratory (LBNL)  
2007-2011 Research Scientist, Earth Science Division, LBNL  
1995-2007 Staff Research Associate, Earth Science Division, LBNL  
1987-1995 Research Associate, Earth Sciences Division, LBNL  
1982-1985 District Manager, Seismograph Service Corp.  
1980-1982 Field Engineer, Birdwell Division, Seismograph Service Corp.

## **Education:**

1987 M.S. Engineering, Engineering Geoscience, Univ. of California, Berkeley  
1980 B.A. Geophysics, Geology and Geophysics, Univ. of California, Berkeley

## **Research Abstract:**

My research is focused on the acquisition and analysis of borehole seismic data from field scale experiments. Problems addressed include continuous monitoring to detect stress changes, monitoring of geologic sequestration of CO<sub>2</sub>, monitoring for risk assessment, characterization of fracture content and dominant fracture orientation in geothermal and oil fields, high resolution imaging of shallow surface materials, imaging fracture flow zones in contaminated aquifers, and integrated geophysical characterization of volcanic tuff flows for nuclear waste isolation at Yucca Mountain.

## **Professional Affiliations:**

Member: Society of Exploration Geophysicists (SEG), American Geophysical Union (AGU), European Association of Geoscientists and Engineers (EAGE), Bay Area Geophysical Society (BAGS)  
District Representative: Council of SEG  
Member: SEG Research Committee  
Chair: SEG CO<sub>2</sub> Research Subcommittee

## **Honors/Awards/Patents**

2012 Best Paper at 2011 Annual Meeting, Society of Exploration Geophysicists  
2011 US Patent 8,717,850 Piezotube Borehole Seismic Source  
2008 Schlumberger Gold Award  
2007 Outstanding Performance Award, Lawrence Berkeley National Lab.  
2006 Outstanding Performance Award, Lawrence Berkeley National Lab.

## **Recent Invited Presentations:**

**Daley, T. M.**, 2014, Pathways to integrate monitoring in risk assessment based modeling, IEAGHG Monitoring Network and Modeling Network – Combined Meeting, Morgantown WV, 4-8 August.

**Daley, T.M.**, 2014, Continuous Active Source Seismic Monitoring (CASSM): Applications to Crosswell Reservoir Monitoring, Society of Exploration Geophysics, Development and Production Forum: Reservoir Characterization and Monitoring with Advanced Geophysical Technology, Santa Rosa, California, July 3, 2014.

**Daley, T.M.**, Miller, D., Freifeld, B.M., Dodds, K., 2014, Results of field testing of simultaneous DAS and Geophone VSP, Workshop: Fibre Optics Sensing for Vertical Seismic Profile (VSP) Surveys: Challenges Faced & The Way Forward for Fiber Optics Sensing Use in VSP Surveys, 76th EAGE Conference & Exhibition 2014, Amsterdam, Netherlands.

**Daley, Thomas M**, and Barry Freifeld, 2014, Borehole Based Monitoring of CO<sub>2</sub> Storage: Recent Developments in Fiber-Optic Sensing, CCS Technical Workshop, Research Institute of Innovative Technology for the Earth, Tokyo, Japan, January 23, 2014.

**Daley, Thomas M**, 2013, Detection, monitoring and modeling of a probable fracture zone at the In Salah CO<sub>2</sub> storage project, Society of Exploration Geophysics, Post-convention Workshop, Houston, Tx, September 27, 2013.

**Daley, Thomas M.**, B.M. Freifeld, P. Cook, R. Trautz, K. Dodds, 2013, Modular Borehole Monitoring (MBM) at SECARB's Citronelle Site: Project Update, IEA GHG CCS Combined Monitoring and Environmental Network Meeting: Canberra, ACT, August 26-30, 2013.

**Daley, Thomas M.**, Barry Freifeld, multiple co-authors, 2013, VSP Acquisition Using Fiber Optic Distributed Acoustic Sensing (DAS): A Comparison of Sites and with Conventional Geophones, Society of Petroleum Engineers Workshop on Distributed Fiber-Optic Monitoring for Well and Reservoir Management, Palos Verdes, CA, July 16-18, 2013.

**Daley, Thomas M.**, Monitoring the Subsurface with Borehole Seismic: CASSM and Beyond, Stanford Geophysics Department Seminar, May 2, 2013.

**Daley, Thomas M.**, Subsurface Monitoring of CO<sub>2</sub> Sequestration – A Review and Look Forward (Invited), 2012, Fall Meeting, American Geophysical Union, Dec. 2012, GC53D-07.

Korneev, V., and **Daley, T.M.**, 2012, Uncertainty of micro-seismic events location during fluid injection, 2012, 1st Joint International Workshop for the Earth's Surface and Subsurface 4D Monitoring, Riyadh, Saudi Arabia, January 8 -11.

**Daley, T.M.**, Jonathan B. Ajo-Franklin, Fenglin Niu, 2011, Recent Results from Crosswell CASSM (Continuous Active-Source Seismic Monitoring), American Geophysical Union Annual Meeting, Special session T05, 5-9 December, San Francisco.

**Daley, T.M.**, 2011, Monitoring Strategies for Geologic Storage of CO<sub>2</sub>, MIT Carbon Sequestration Forum XII, Cambridge MA, October 26.

Jonathan Ajo-Franklin, **Thomas Daley**, Belinda Butler-Veytia, John Peterson, Yuxin Wu, Bob Kelly, and Susan Hubbard, 2011, Multi-level continuous active source seismic monitoring (ML-CASSM): Mapping shallow hydrofracture evolution at a TCE contaminated site, SEG Expanded Abstracts 30, 3727 (2011), DOI:10.1190/1.3627980

**Daley, T.M.**, 2011, Seismic Monitoring of Geologic Sequestration, Research and Development Symposium, Society of Petroleum Engineers, Austin, Tx, June 7.

**Daley, T.M.**, 2010, Geophysical Characterization/MMV Experiences, Joint SECARB Meeting, Electric Power Research Institute, Palo Alto, CA, July 14.

**Daley, T.M.**, E. Majer, M, Hoversten, R. Gritto, J. Ajo-Franklin, 2010, Borehole Seismic Monitoring of Sequestration Pilots, Geologic Carbon Sequestration Site Integrity: Characterization and Monitoring Workshop, Columbus, Ohio, June 7-8, 2010.

Majer, E. and **Daley, T.M.**, 2010, Induced Seismicity Associated with Fluid Injections for Energy Resource Applications: Lessons learned from Geothermal, Geologic Carbon Sequestration Site Integrity: Characterization and Monitoring Workshop, Columbus, Ohio, June 7-8, 2010.

**Daley, T.M.**, 2010, MMV Planning in WESTCARB and DOE's National Risk Assessment Partnership (NRAP), 6<sup>th</sup> Annual International Energy Agency Greenhouse Gas Monitoring Network, Natchez, MS, May 2010.

## **Journal Publications - Peer and Editorial Reviewed, Book Chapters:**

Zhang, R., Vasco, D., **Daley, T.M.**, 2014 (submitted), Characterization of a fracture zone using seismic attributes at the InSalah CO2 storage project, Interpretation.

Zhang, R., **Daley, T.M.**, Vasco, D., 2014 (in review), Application of sparse layer inversion on 3D seismic at the In Salah carbon dioxide storage project for improved thin-bed resolution, International Journal of Greenhouse Gas Control.

**Daley, T.M.**, Miller, D., Dodds, K., Cook, P., Freifeld, B.M., 2014 (submitted), Field Testing of Modular Borehole Monitoring with Simultaneous Distributed Acoustic Sensing and Geophone Vertical Seismic Profile at Citronelle, Mississippi, submitted to Geophysical Prospecting.

**Daley, T.M.**, Freifeld, B., Siggins, T., 2014, Seismic Monitoring at Naylor-1 using High Resolution Travel Time (HRTT) and Offset VSP, In: *Geologically Storing Carbon: Learning from the Otway Project Experience*. (Ed. P J Cook) 408pp. CSIRO Publishing, Melbourne, ISBN: 9781486302307.

Vasco, D.W., **Thomas M. Daley** and Andrey Bakulin, 2014, Utilizing the onset of time-lapse changes: a robust basis for reservoir monitoring and characterization, Geophysical Journal International, doi: 10.1093/gji/ggt526.

Oye, Volker, Eyvind Aker, **Thomas M. Daley**, Daniela Kühn, Bahman Bohloli, Valeri Korneev, Microseismic Monitoring and Interpretation of Injection Data from the in Salah CO2 Storage Site (Krechba), Algeria, 2013, Energy Procedia, Volume 37, 2013, Pages 4191-4198, ISSN 1876-6102, <http://dx.doi.org/10.1016/j.egypro.2013.06.321>.

**Daley, Thomas M.**, Barry M. Freifeld, Jonathan Ajo-Franklin, Shan Dou, Roman Pevzner, Valeriya Shulakova, Sudhendu Kashikar, Douglas E. Miller, Julia Goetz, Jan Henninges, Stefan Lueth, 2013, Field testing of fiber-optic distributed acoustic sensing (DAS) for subsurface seismic monitoring, The Leading Edge 32, 6 (2013); pp. 699-706, <http://dx.doi.org/10.1190/tle32060699.1>

Doetsch, J., Kowalsky, M.B., Doughty, C., Finsterle, S., Ajo-Franklin, J.B., Carrigan, C., Yang, X., Hovorka, S.D., **Daley, T.M.**, 2013. Constraining CO2 simulations by coupled modeling and inversion of electrical resistance and gas composition data. International Journal of Greenhouse Gas Control 18, 510-522.

Ajo-Franklin, J., B., Peterson, J., Doetsch, J., **Daley, T.M.**, 2013, High-Resolution Characterization of a CO2 Plume Using Crosswell Seismic Tomography: Cranfield, MS, International Journal of Greenhouse Gas Control, 18, 497-509, <http://dx.doi.org/10.1016/j.ijggc.2012.12.018>

Nakagawa, Seiji, Timothy J. Kneafsey, **Thomas M. Daley**, Barry M. Freifeld, and Emily V. Rees, 2013, Laboratory seismic monitoring of supercritical CO2 flooding in sandstone cores using the Split Hopkinson Resonant Bar technique with concurrent x-ray CT imaging, Geophysical Prospecting, 61, 254–269.

Baptiste Dafflon, Yuxin Wu, Susan S Hubbard, Jens Birkholzer, **Thomas M. Daley**, John D. Pugh, John E. Peterson, and Robert Trautz, 2012, Monitoring CO2 intrusion and associated geochemical transformations in a shallow groundwater system using complex electrical methods, Environ. Sci. Technol., Accepted Manuscript, DOI: 10.1021/es301260e, Publication Date (Web): 07 Jun 2012

**Daley, Thomas M.**, Jonathan B. Ajo-Franklin, Christine Doughty, 2011, Constraining the reservoir model of an injected CO2 plume with crosswell CASSM at the Frio-II brine pilot, International Journal of Greenhouse Gas Control, 5, pp. 1022-1030, DOI information: 10.1016/j.ijggc.2011.03.002.

Myer, L. R., and **Daley, T. M.**, 2011, Elements of a best practices approach to induced seismicity in geologic storage, *Energy Procedia*, V. 4, p 3707-3713.

Hovorka, S.D., Timothy A. Meckel, Ramon H. Trevino, Jiemin Lu, Jean-Philippe Nicot, Jong-Won Choi, David Freeman, Paul Cook, **Thomas M. Daley**, Jonathan B. Ajo-Franklin, Barry M. Freifeild, Christine Doughty, Charles R. Carrigan, Doug La Brecque, Yousif K. Kharaka, James J. Thordsen, Tommy J. Phelps, Changbing Yang, Katherine D. Romanak, Tongwei Zhang, Robert M. Holt, Jeffery S. Lindler, Robert J. Butsch, Monitoring a large volume CO<sub>2</sub> injection: Year two results from SECARB project at Denbury's Cranfield, Mississippi, USA, *Energy Procedia*, Volume 4, 2011, Pages 3478-3485.

Zhou, Rongmao, Lianjie Huang, James T. Rutledge, Michael Fehler, **Thomas M. Daley**, Ernest L. Majer, 2010, Coda-wave interferometry analysis of time-lapse VSP data for monitoring geological carbon sequestration, *International Journal of Greenhouse Gas Control*, 4, 679–686, doi:10.1016/j.ijggc.2010.01.010. LBNL-3076E.

**Daley, Thomas M.**, Fenglin Niu, Paul G. Silver, Ernest L. Majer, 2010, Acquisition of Crosswell Seismic Monitoring Data. In: Junzo Kasahara, Valeri Korneev and Michael Zhdanov, editors: Active Geophysical Monitoring, Vol 40, Handbook of Geophysical Exploration: Seismic Exploration, Klaus Helbig and Sven Treitel. The Netherlands, Elsevier, 2010, pp. 165-176.

Lumley, D., Sherlock, D., **Daley, T.**, Huang, L., Lawton, D., Masters, R., Verliac, M., and White, D., 2010. Highlights of the 2009 SEG summer research workshop on “CO<sub>2</sub> Sequestration Geophysics,” *The Leading Edge*, v29, p138-145, LBNL-3074E.

Xu, T., Y.K. Kharaka, C. Doughty, B.M. Freifeld, **T.M. Daley**, Reactive transport modeling to study changes in water chemistry induced by CO<sub>2</sub> injection at the Frio brine pilot, *Chemical Geology*, v. 271, p. 153-164, 2010. (LBNL-3056E)

Dodds, K., **Daley, T.**, Freifeld, B., Urosevic, M., Kepic, A. and Sharma, S., 2009, Developing a monitoring and verification plan with reference to the Australian Otway CO<sub>2</sub> pilot project, *The Leading Edge*, v28, n7, 812-818, LBNL-2310E.

Freifeld, B.M., **Daley, T.M.**, Hovorka, S.D., Hennings, J., Unterschultz, J., and Sharma S, 2009, Recent advances in well-based monitoring of CO<sub>2</sub> sequestration, *Energy Procedia*, Elsevier, Vol. 1, Issue 1, 2277 – 2284.

Niu, F., Silver, P.G., **Daley, T.M.**, Cheng, X., Majer, E.L., 2008, Preseismic velocity changes observed from active source monitoring at the Parkfield SAFOD drill site, *Nature*, 454, 204-208, DOI:10.1038/nature07111, LBNL-717E.

**Daley, T.M.**, Myer, L.R., Peterson, J.E., Majer, E.L., Hoversten, G.M., 2008, Time-lapse crosswell seismic and VSP monitoring of injected CO<sub>2</sub> in a brine aquifer, *Environmental Geology*, 54, 1657-1665, DOI:10.1007/s00254-007-0943-z.

**Daley, T.M.**, R.D. Solbau, J.B. Ajo-Franklin, S.M. Benson, 2007, Continuous active-source monitoring of CO<sub>2</sub> injection in a brine aquifer, *Geophysics*, v72, n5, pA57–A61, DOI:10.1190/1.2754716.

Silver, P.G., **Daley, T.M.**, Niu, F., Majer, E.L., 2007, Active source monitoring of crosswell seismic travel time for stress induced changes, *Bulletin of Seismological Society of America*, v97, n1B, p281-293.

Ajo-Franklin, J.B., Minsley, B.J., **Daley, T.M.**, 2007, Applying Compactness Constraints To Seismic Traveltime Tomography, *Geophysics*, v72, n4, pR67-R75, DOI:10.1190/1.2742496.

- Majer, E. L., **T. M. Daley**, V. Korneev, D. Cox, J. E. Peterson, and J. H. Queen, 2006, Cost-effective imaging of CO<sub>2</sub> injection with borehole seismic methods, *The Leading Edge*, V25, n10, pp. 1290-1302.
- Hovorka, S.D., Benson, S.M., Doughty, C., Freifeld, B.M., Sakurai, S., **Daley, T.M.**, Kharaka, Y.K, Holtz, M.H., Tarutz, R.C., Nance, S.H., Myer, L.R. and Knauss K.G., 2006, Measuring permanence of CO<sub>2</sub> storage in saline formations: the Frio experiment, *Environmental Geosciences*, V. 13, no 2, pp 1-17, DOI:10.1306/eg.11210505011.
- Daley, T.M.**, Schoenberg, M.A., Rutqvist, J., Nihei, K.T., 2006, Fractured reservoirs: An analysis of coupled elasto-dynamic and permeability changes due to pore pressure variation, *Geophysics*, v71, n5, O33-O41.
- Nakagawa, S. and **Daley, T.M.**, 2006, Analytical modeling of wave generation by the borehole orbital vibrator source, *Geophysics* 71, F1-F11.
- Schoenberg, M.A., and **Daley, T.M.**, 2004, Criteria for quasi-shear wavefront triplication in a transversely isotropic material, *Journal of the Acoustical Society of America*, 115, p2626.
- Gritto, R., **T.M. Daley**, and L.R. Myer, 2004, Joint cross well and single well seismic studies of CO<sub>2</sub> injection in an oil reservoir, *Geophysical Prospecting*, 52, p323-339.
- Gritto, R., V.A. Korneev, **T.M. Daley**, M.A. Feighner, E.L. Majer, and J.E. Peterson, 2004, Surface-to-tunnel seismic tomography studies at Yucca Mountain, Nevada. *Journal of Geophysical Research*, v109, nB3, B03310, 10.1029/2002JB002036, LBNL-50470.
- Korneev, V.A., Goloshubin, G.M., **Daley, T.M.**, and Silin, D.B., 2004, Seismic low-frequency effects in monitoring of fluid saturated reservoirs, *Geophysics*, 69, 522-532.
- Daley, T.M.**, Majer, E.L., Peterson, J.E., 2004, Crosswell seismic imaging in a contaminated basalt aquifer, *Geophysics*, 69, 16-24.
- Gritto, R., Romero, A.E., **Daley, T.M.**, 2004, Results of a VSP experiment at the Resurgent Dome, Long Valley Caldera, California, *Geophysical Research Letters*, v31, L06603, doi:10.1029/2004GL019451, LBNL-52488.
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- Daley, T.M.**, Gritto, R., Majer, E.L., West, P., 2003, Tube-wave suppression in single-well acquisition, *Geophysics*, 68, p863-869.
- Gritto, R.; **Daley, T. M.**; Majer, E. L., 2003: Estimating Subsurface Topography from Surface-to-Borehole Seismic Studies at the Rye Patch Geothermal Reservoir, Nevada, USA, *Geothermics*, Vol. 32, No.3, pp. 275-295 , LBNL-50490.
- Daley, T.M.** and Cox, D., 2001, Orbital vibrator seismic source for simultaneous P- and S-wave crosswell acquisition, *Geophysics*, 66, 1471-1480.
- D'Onfro, P.S., Rizer, W.D., Queen, J.H., Majer, E.L., Peterson, J.E., **Daley, T.M.**, Vasco, D.W., Datta-Gupta, A., Long, J.C.S., 1998, An integrated approach for characterizing fractured reservoirs. In: Jones, G., Fisher, Q.J. and Knipe, R.J. (eds) *Faulting, Fault Sealing and Fluid Flow in Hydrocarbon Reservoirs*. Geological Society, London, Special Publications, 147, 193-208. doi:10.1144/GSL.SP.1998.147.01.12
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Majer, E.L., Peterson, J.E., **Daley, T.M.**, Kaelin, B., Queen, J., D'Onfro, P., and Rizer, W., 1997, Fracture Detection using Crosswell and Single Well Surveys, *Geophysics*, v62, n2.

Majer, E.L., Datta-Gupta, A., Peterson, J.E., Vasco, D.W., Meyer, L.R., **Daley, T.M.**, Kaelin, B., Queen, J., D'Onfro, P.S., Rizer, W.D., Cox, D., and Stinton, J., 1996, Utilizing crosswell, single well and pressure transient tests for characterizing fractured gas reservoirs, *The Leading Edge*, v15, n8.

**Daley, T.M.**, and T. V. McEvelly, Shear-Wave Anisotropy in the Parkfield Varian Well, 1990, *Bulletin of the Seismological Society of America*, 80, p857, 1990.

**Daley, T.M.**, T.V. McEvelly and E.L. Majer, Multiply Polarized Shear-Wave VSP's from the Cajon Pass Drillhole, 1988, *Geophysical Research Letters*, v15, p1001, 1988.

**Daley, T.M.**, T. V. McEvelly and E.L. Majer, 1988, Analysis of P and S wave VSP Data from the Salton Sea Scientific Drilling Project, *Journal of Geophysical Research*, v93, p13025.

## **LBL and Project Scientific Reports:**

Newman, G. Um, E., **Daley, T.M.**, 2014, EM Modeling at Aquistore: Final Report to the Carbon Capture Project, Lawrence Berkeley National Laboratory.

**Daley, T.M.**, 2014, Letter Report on Monitoring Planning for Kimberlina Synthetic Site, National Risk Assessment Partnership.

**Daley, T.M.**; Harbert W.; Bromhal G.; Sullivan, E.C.; *Monitoring Strategies for Risk Reduction in Carbon Storage*, NRAP-TRS-III-00X-2013, Level III Technical Report Series, March 2014.

**Daley, T. M.**; Sullivan, E. C.; Tan, S.; Huang, L.; Harbert, W. *Analysis of Field VSP Data: Cranfield 3D-VSP Project*, NRAP-TRS-III-XXX-2013; NRAP Technical Report Series; U.S. Department of Energy, National Energy Technology Laboratory: Morgantown, WV, 2013; p X.

White, Joshua A., William Foxall, Corinne Bachmann, **Thomas M. Daley**, and Laura Chiaramonte, *Induced Seismicity and Carbon Storage: Risk Assessment and Mitigation Strategies*, National Risk Assessment Partnership, Technical Report Series, 2014.

Quanlin Zhou; Yoojin Jung; Fei Chen; Xiaoyi Liu; Jens T. Birkholzer; Michael B. Kowalsky; **Tom Daley**. *Early Detection of Brine and CO<sub>2</sub> Leakage Using Pressure and Surface-Deformation Monitoring Data: Methodology Development, Demonstration, and Application*; NRAP-TRS-III-XXX-2013; NRAP Technical Report Series; U.S. Department of Energy, National Energy Technology Laboratory: Morgantown, WV, 2013; p XX.

Freifeld, B.M., **Thomas M. Daley** and Paul Cook, 2013, Modular Borehole Monitoring An Integrated Deployment Package, Final Report to CO<sub>2</sub> Capture Project. LBNL ????

**Daley, T.M.**, Beyer, J, Smith, T. and La Brecque, D, 2013, Borehole EM Monitoring at Aquistore: Final Report to the Carbon Capture Project (CCP), Report Number: LBNL-6238E, Lawrence Berkeley National Laboratory.

Kowalsky, Michael B., Joseph Doetsch, Michael Commer, Stefan Finsterle, Christine Doughty, Quanlin Zhou, Jonathan Ajo-Franklin, Jens Birkholzer, **Thomas Daley**, 2013, Coupled Inversion of Hydrological and Geophysical Data for Improved Prediction of Subsurface CO<sub>2</sub> Migration, Lawrence Berkeley National Laboratory Report, NRAP-TRS-III-00X-2013, Level III Technical Report Series, September 2013.

Nazari, Siamak and **Daley, Thomas M.** *Assessing Uncertainty and Repeatability in Time-lapse VSP Monitoring of CO<sub>2</sub> Injection in a Brine Aquifer, Frio Formation, Texas (A case study)*; Report LBNL-6482E, NRAP-TRS-III-XXX-2012; NRAP Technical Report Series; U.S. Department of Energy, National Energy Technology Laboratory: Morgantown, WV, Lawrence Berkeley National Laboratory, Berkeley, CA; 2013, p XX.

**Daley, T.M.**, J.E. Peterson, V.A. Korneev, GEO-SEQ Subtask 2.3.4: Microseismic Monitoring and Analysis, LBNL-4597E, May 2011

**Daley, T.M.**, R. Haught, J.E. Peterson, K. Boyle, J.H. Beyer and L.R. Hutchings, 2010, Seismicity Characterization and Monitoring at WESTCARB's Proposed Montezuma Hills Geologic Sequestration Site, Lawrence Berkeley National Laboratory Report LBNL-4006E, October 2010.

**Daley, T.M.**, Sandeep Sharma, Aleksander Dzunic, Milovan Urosevic, Anton Kepic, Don Sherlock, 2009, Borehole Seismic Monitoring at Otway Using the Naylor-1 Instrument String, LBNL-2337E.

**Daley, T.M.**, Freifeld, B.M., Ajo-Franklin, J.B., Doughty, C., Benson, S.M., Frio-II Brine Pilot: Report on GEOSEQ Activities, 2007, Lawrence Berkeley National Laboratory Report, LBNL-63613.

**Daley, T.M.** and Majer E.L., 2007, Borehole seismic monitoring of seismic stimulation at Occidental Permian Ltd's South Wason Clear Fork Unit, LBNL-62613.

**Daley, T.M.**, Niu, F., Silver, P.G., and Majer, E.L., Acquisition of crosswell seismic monitoring data, Special Issue on Active Source Monitoring, LBNL-62400.

Benson, Sally M., Myer, Larry R., Oldenburg, Curtis M., Doughty, Christine A., Pruess, Karsten, Lewicki, Jennifer, Hoversten, Mike, Gasperikova, Erika; **Daley, Thomas**; Majer, Ernie; Lippmann, Marcelo Tsang, Chin-Fu; Knauss, Kevin; Johnson, James; Foxall, William Ramirez, Abe; Newmark, Robin; Cole, Dave; Phelps, Tommy J.; Parker, J. Palumbo, A.; Horita, J.; Fisher, S.; Moline, Gerry; Orr, Lynn Kovscek, Tony; Jessen, K.; Wang, Y.; Zhu, J.; Cakici, M.; Hovorka, Susan; Holtz, Mark; Sakurai, Shinichi; Gunter, Bill; Law, David van der Meer, Bert., GEO-SEQ Best Practices Manual. Geologic Carbon Dioxide Sequestration: Site Evaluation to Implementation, 2004, LBNL-56623.

Majer, Ernest; Queen, John; **Daley, Tom**; Fortuna, Mark; Cox, Dale; D'Onfro, Peter; Goetz, Rusty; Coates, Richard; Nihei, Kurt; Nakagawa, Seiji; Myer, Larry; Murphy, Jim; Emmons, Charles; Lynn, Heloise; Lorenz, John; LaClair, David; Imhoff, Mathias; Harris, Jerry; Wu, Chunling; Urban, Jame; Maultzsch, Sonja; Liu, Enru; Chapman, Mark; Li, Xiang-Yang; A Handbook for the Application of Seismic Methods for Quantifying Naturally Fractured Gas Reservoirs in the San Juan Basin, New Mexico, 2004, LBNL-56409.

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**Daley, T.M.**, R. Gritto, and E.L. Majer, Single-well seismic imaging of a gas-filled hydrofracture, Berkeley, California, 2003. Berkeley Lab Report LBNL-53601.

Gritto, R., A.E. Romero, and **T.M. Daley**, VSP analysis at Long Valley Caldera, California. Geophysical Research Letters (submitted), 2003; Berkeley Lab Report LBNL-52488, 2003.

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Gritto, R., **Daley, T. M.**, Myer, L. R., Joint Cross Well and Single Well Studies at Lost Hills, California, Lawrence Berkeley National Laboratory Report, LBNL-50651, Berkeley, CA, 2002.

**Daley, T.M.** and Gritto, R., 2001, Field test of INEEL tube-wave suppressor and LBNL borehole seismic system at Richmond Field Station, February 2001, LBNL-49015, Berkeley, Ca.

Gritto, R, **Daley, T.M.**, and Majer, E.L., Seismic mapping of the subsurface structure at the Ryepatch geothermal reservoir, Lawrence Berkeley National Laboratory Report, LBNL-47032, Berkeley Ca., October, 2000.

**Daley, T.M.**, Majer, E.L., Peterson, J.E., Crosswell seismic imaging in a contaminated basalt aquifer, Lawrence Berkeley National Laboratory Report LBNL-45533, Berkeley CA, April, 2000.

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**Daley, T.M.**, Feighner, M.A., Majer, E.L., Monitoring underground gas storage in a fractured reservoir using time lapse VSP, Lawrence Berkeley National Laboratory Report LBNL-44876, Berkeley, CA, March 2000.

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## **Conference Presentations with Papers or Abstracts:**

**Daley, T.M.**, Hendrickson, J., Queen, J.H., 2014, Monitoring CO<sub>2</sub> Storage at Cranfield, Mississippi with Time-Lapse Offset VSP – Using Integration and Modeling to Reduce Uncertainty, 12<sup>th</sup> International Conference on Greenhouse Gas Control Technologies, Austin, Tx., October 5-9.

**Daley, T.M.**, Miller, D., Freifeld, B.M., Dodds, K., 2014, Results of field testing of simultaneous DAS and Geophone VSP, Workshop: Fibre Optics Sensing for Vertical Seismic Profile (VSP) Surveys: Challenges Faced & The Way Forward for Fiber Optics Sensing Use in VSP Surveys, 76th EAGE Conference & Exhibition 2014, Amsterdam, Netherlands. Invited

Cocker, J., Craven, M., Herkengoff, F., Strudley, A., White, D., **Daley, T.**, Miller, D., 2014, A direct comparison of Fibre-Optic distributed acoustic sensing (DAS) and conventional 3C clamped geophones in a 3D VSP, Workshop: Fibre Optics Sensing for Vertical Seismic Profile (VSP) Surveys: Challenges Faced & The Way Forward for Fiber Optics Sensing Use in VSP Surveys, 76th EAGE Conference & Exhibition 2014, Amsterdam, Netherlands. Invited

Bachmann, C., W. Foxall, and **T. Daley**, 2014. Comparing induced seismicity on different scales, Proc. 39th Workshop on Geothermal Reservoir Eng., Stanford University, Calif., Feb 24-26, 7p.

Bachmann, C.E., William Foxall; **Thomas M. Daley**, 2013, Induced Seismicity of the Paradox Valley Brine Injection, American Geophysical Union Fall Meeting, Paper S33D-2481, San Francisco, December 9-13.

**Daley, T.M.**, Joel Hendrickson, John H. Queen, 2013, Analysis of Time-Lapse Offset VSP For Monitoring of CO<sub>2</sub> Storage at Cranfield, Mississippi, American Geophysical Union Fall Meeting, Paper S33C-2439, San Francisco, December 9-13.

Zhang, R., and **Daley, T.M.**, 2013, Modeling scattering from fracture zones in surface seismic: monitoring CO<sub>2</sub> at InSalah, American Geophysical Union Fall Meeting, Paper S23-E06, San Francisco, December 9-13.

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Doetsch, J.; Michael B. Kowalsky; Christine Doughty; Stefan Finsterle; Jonathan B. Ajo Franklin; Xianjin Yang; Charles R. Carrigan; **Thomas M. Daley**, 2012, Structural and Fully Coupled Joint Inversion for CO<sub>2</sub> Migration Monitoring (Invited), Fall Meeting, American Geophysical Union, Dec. 2012 NS34A-01.

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